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RUST NOTES FOR 1904.

J. M. BATES.

At Callaway, Neb., I had the opportunity, in 1902-3, of making some observations on the relations between the *Puccinia* on *Distichlis stricta* and the *Aecidium* on *Chenopodium album* and *C. leptophyllum* that led to the cultures of these aecidia by Dr. J. C. Arthur, from material sent by me. At the same time I collected *Aecidium* on *Cleome serrulata* and *Lepidium apetalum* in equally close connection with the *Distichlis* rust. But knowing little, at the time, of the investigations in rust relationships, I placed no importance on the facts. In January 1903 I moved to Red Cloud, Webster Co., and had an equally good chance to study the *Distichlis* rust; and a growing interest in the whole subject. Here I found the *Aecidium* on *Cleome* and *Lepidium* in such close relation with *Distichlis* as to convince me that they were mutually dependent the one on the other, and so wrote to Mr. Holway. He replied that no rust had been known to occupy the plants of more than one order, and that my claim was hardly tenable.

I watched the early *Uredo* form on *Distichlis* with no other *Aecidium* at hand but that on *Cleome*, and my conviction grew, so that in 1904 I asked Dr. Arthur to test the matter with my teleutospores. In two or three weeks I learned from him that the test was a success on *Cleome* and *Lepidium*. I then began further investigations, having in the meantime found abundant aecidia on *Salsola tragus*, under the same conditions that surrounded the *Cleome*, with no room for doubt that it came from *Distichlis*.

It seemed that there was no reason why I should not find it on others of the *Cruciferae* growing under the same conditions. The hunt was made and the aecidia found on *Sophia incisa* and *Roripa sinuata* May 25, and on *Bursa bursa-pastoris* May 31. It affected stems and leaves about equally in proportion to surface exposed. I would not think from the amount found that these genera were as susceptible as *Chenopodium* and *Lepidium*. The aecidia were magnificent on both last year. I made some cultures on both genera in May, and had apparent success; but such out-door cultures are not of much scientific value, in the neighborhood of the real thing. *Chenopodium hybridum* failed to show inoculation. The plants may have been too old (6 in. to 12 in.). I hope to try young plants this year.

We evidently have here a cosmopolitan rust, wonderfully adaptable. I see no reason to think that its possibilities have been exhausted by these finds, four of which I suppose are new to science. Let others who live near this grass rust follow up the clue here given, as I hope to do still further.

May 23, I found one strong plant of *Astragalus lotiflorus nebraskensis* Bates, the only one found within 30 miles. It was well covered with *Uromyces astragali*, which heretofore has been confined in Nebraska to *Astragalus mollissimus* and *adsurgens*. It is common on the former 30 miles west, but I have not found it on that host here, though the host is abundant. I took leaves of this, and laid them in among the leaves of *A. shortianus* May 28, and later, with no infection. May 29, I did the same to *A. plattensis* and *A. crassicaupus*, a mile away. June 14, both plants were well infected. *A. plattensis* however carried on the disease through the season with more vigor, proving the better host.

Red Cloud, Neb., March 7, 1905.

SOME SUGGESTIONS FROM THE STUDY OF DAIRY FUNGI.*

CHARLES THOM.

The importance of certain saprophytic fungi in the arts has only begun to be realized in recent years. Nevertheless numerous papers chiefly chemical have already dealt with the effects of such organisms upon many organic media. It is when one is confronted with one of these problems as a practical proposition and tries to utilize the results of mycological work already published, that he begins to realize the hopeless muddle of our present nomenclature and descriptions in certain cosmopolitan genera.

In the beginning of the dairy investigation with which I am connected I encountered several problems. Nearly all the studies upon milk and milk products have been the work of bacteriologists, consequently when dairy fungi have been concerned these studies are almost purely physiological. In fact in very few cases has sufficient attention been given to the morphology of the forms studied to make their identity in any degree certain. Similarly a number of chemical investigators have studied the effects of fungi upon special media without proper studies of morphology. Thus we find a considerable mass of literature representing a great deal of work in which the species involved can scarcely be determined. So little importance has been attached to species that the author of a recent paper when asked for a culture of his organism replied, that any green *Penicillium* would produce the same effects. Nevertheless such wide divergence of results as we find in papers dealing with organisms for which the same specific name is used indicates that the

* Published by permission of the Chief of the Dairy Division of the Bureau of Animal Industry.